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# Greenspace programs and recovery from substance use and mental health challenges: evaluating nature-based interventions through the lens of recovery capital

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## ABSTRACT

**Background:** Greenspace programs are nature-based health initiatives. Recovery depends on individual, social and community resources, known as recovery capital. This paper explores how greenspace programs generate recovery capital to improve physical and mental health for those experiencing co-occurring problem substance use and mental health challenges.

**Methods:** Interviews were conducted with participants with experience of greenspace programs (n=33). Findings in the current paper focus on program attendees and program staff (n=23). Interviews were audio recorded, transcribed, and analyzed to explore greenspace programs through the lens of recovery capital.

**Results:** Programs increase individual recovery capital through improved capacity to deal with triggers, stressors, and cravings; improved capacity for positive daily routines and self-care practices; knowledge acquisition and physical capital. Social recovery capital is generated through social connections, trust, and relationships with staff and existing networks. Community recovery capital is accrued through engagement with community and cultural spaces. Connecting to nature through greenspace programs helped participants reflect on life meaning and purpose.

**Conclusions:** Mapping greenspace program outcomes onto established recovery theory shows that programs can effectively support health and recovery amongst populations experiencing problem substance use and mental health challenges.

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## Introduction

Greenspace programs are health initiatives conducted in nature, with the aim of enhancing mental and physical health and wellbeing (Masterton et al, 2020; 2022). 'Nature' and 'greenspace' are often used interchangeably and are terms used to describe flora and fauna in areas with a high density of greenery, such as forests, rural environments, or purpose-built spaces within urban areas such as allotments and parks (Browning et al, 2022; Houlden et al, 2018). Greenspace programs vary in design, including structured programs with a therapeutic focus, or less formal drop-in services (Benvegna et al, 2024; Biggs, Morris & Rees, 2022; Leighton et al, 2021; Picton et al, 2020). Programs may incorporate various activities including

gardening, organized walks, nature-based mindfulness, and conservation work, amongst others (Bragg, & Atkins, 2016).

Attending a greenspace program has been found to promote wellbeing amongst populations with experience of problem substance use (PSU) and mental health challenges (Benvegna et al, 2024; Berry et al, 2021, Diaz-Martinez et al, 2024; Masterton et al, 2020; Masterton et al, 2021; Masterton et al, 2022; Picton et al, 2020; Russell, 2005, Shirazi et al, 2025). PSU has no singular definition but has been defined as a 'psychobiological syndrome... a disorder of regulation of substance use. It comprises impaired control over substance use, continued use of the substance despite harmful consequences, and often increased tolerance and withdrawal symptoms' (Saunders & Latt, 2021: p.91). Much like problem

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substance use, defining mental health challenges is a contested subject, but has been surmised by Galderisi et al., (2015: p.231) as 'basic cognitive and social skills; ability to recognize, express and modulate one's own emotions, as well as empathize with others; flexibility and ability to cope with adverse life events and function in social roles; and harmonious relationship between body and mind represent important components of mental health which contribute, to varying degrees, to the state of internal equilibrium.'

Evidence shows a range of wellbeing benefits for those who take part in greenspace programs. Program participants describe experiencing increased feelings of escape (Garst et al, 2025); space for reflection (Nejade et al, 2022); physical activity (Coventry et al, 2021); development of new skills (Obeng et al, 2025); feelings of having a purpose (Joschko et al, 2023); improved social interactions (Harper, 2017); and reduced isolation (Sachs et al, 2024). It is through these processes that greenspace programs are believed to lead to beneficial outcomes for people with PSU and mental health concerns and contribute toward their ongoing recovery (Masterton et al, 2022).

### **Defining recovery**

It is important to define 'recovery' in the context of this paper, since recovery from substance use challenges is a complex, dynamic process (Best et al, 2016; Best & Hennessy, 2022; Leamy et al, 2011; Neale et al, 2015). Substance use researchers are now moving away from static, abstinence-based definitions of recovery, recognizing the complexity of the process (Pettersen et al, 2023). Nevertheless, there is a tendency for the term recovery to be broadly associated with idealized visions of normative citizenry in relation to 'models of social, financial, family and productive life' (Theodoropoulou et al, 2022: p.1). Politically, recovery concepts still favor abstinence-based approaches, as opposed to harm reduction approaches, potentially isolating those experiencing PSU who wish to achieve wellbeing without total abstinence (Eekhoudt et al, 2024; Herczyk et al, 2023; Pettersen et al, 2023). Similarly, what is understood as recovery from mental health challenges depends on the conceptualizations of recovery undertaken not only by the individual, but also by mental health services and governmental bodies that function within the same context (Pilgrim, 2008).

Cleveland et al. (2021: p.111) define recovery as a 'transformational, dynamic process that unfolds over time and encompasses development and maintenance of a broad set of behavioral, cognitive, social, and physical characteristics. Rather than relating only to

use of substances, recovery may also be linked to lifestyle changes that contribute to improvements in wellbeing and health, reconsideration and reconfiguration of social networks, daily occupation, discovering the value of everyday life, and the development of positive coping mechanisms (Pettersen et al, 2023). Recovery is often a non-linear process, and it is important to note that individuals may experience setbacks and lapses (Parlier-Ahmal et al, 2021; Pettersen et al, 2023, Zenmore et al, 2023). However, although recovery journeys are dynamic, they often involve distinct 'stages', identified as: early recovery (first year); stable recovery (year 1–5); and sustained/long-term recovery (Goshorn et al, 2023; Laudet & White, 2008; Theodoropoulou et al, 2022).

### **Recovery capital**

Recovery capital is a commonly used concept which refers to the 'breadth and depth of internal and external resources that can be drawn upon to initiate and sustain recovery' (White & Cloud, 2008 p.1). It is a strengths-based approach that aims to conceptualize the internal and external capacities of a person that allow them to flourish within the context of their life (Best & Ivers, 2022; Cloud & Granfield, 2008). Recovery capital as a concept has been critiqued as it may neglect to consider the political, economic and societal influence on personal choice and behavior, and places the onus of change onto the individual (Fomiatti et al., 2019). Nevertheless, measuring recovery capital can be a valuable indicator of achieving long-term recovery (Bellaert et al., 2024). Furthermore, applying recovery capital as a concept can be valuable when contemplating appropriate interventions to support those experiencing PSU and mental health challenges, as measuring recovery capital can support the conceptualization and identification of areas where there are limited resources (Best et al, 2016, Bunaciu et al, 2024; Duffy et al, 2013).

Recovery capital is commonly categorized at three levels: individual, social, and community/environmental level. Individual recovery capital is considered to be the personal capacity of a person to achieve and maintain wellbeing (Arndt et al, 2017, Bunaciu et al, 2024; Hennessy, 2017). Human and physical capital can be understood as a sub-set of individual-level recovery capital. Human capital includes knowledge, education, skills, and other resources that encourage personal growth and development (Becker, 1962, Cleveland et al, 2021). Physical capital relates to tangible assets like physical health and appropriate shelter (Best & Hennessy, 2022; Osborne & Kelly, 2023). Social recovery capital refers to resources gained through social

interaction, including recovery networks, access to reliable information and emotional support (Collinson & Best, 2019; Roxburgh et al, 2024). Community/environmental capital relates to the broader environment in which an individual navigates, including aspects such as access to treatment, policies, and supportive attitudes (Best & Hennessy, 2022). Cultural capital refers to recovery resources and pathways available to an individual that resonate depending on beliefs and values (Pars et al, 2023; White & Cloud, 2008). It is important to note that despite individual definitions, the categorizations and embodiments of recovery capital are interdependent. For example, those who have acquired social-level recovery capital through recovery-positive relationships will be more likely to further engage with those with shared values, thus leading to increased cultural capital. Bourdieu (1986) writes "cultural capital can be acquired... depending on the period, the society, and the social class, in the absence of any deliberate inculcation, and therefore quite unconsciously. It always remains marked by its earliest conditions of acquisition which, through the more or less visible marks they leave (such as the pronunciations characteristic of a class or region), help to determine its distinctive value. It cannot be accumulated beyond the appropriating capacities of an individual agent; it declines and dies with its bearer (with his biological capacity, his memory, etc.)" (p4). This encapsulates the ways in which individual, social and community/environmental capital are interdependent and interact to determine the extent to which an individual can access, obtain and sustain recovery-positive resources and ultimately, recovery capital.

### ***Aim of the current study***

There is growing evidence that greenspace programs can support improved recovery, health and wellbeing outcomes for individuals experiencing PSU and mental health challenges (Benvegnù et al., 2024; Bragg & Atkins, 2016; Browning et al., 2022; Coventry et al., 2021). Despite evidence that greenspace programs can support recovery, and many programs' outcomes appear to map onto established mental health and substance use recovery outcomes (Berry et al., 2021; Gudmundsson et al., 2025), there has yet to be an exploration of greenspace programs explicitly through the lens of recovery capital theory. It is important to address this gap, because greenspace programs run the risk of being viewed as alternative and different. A change from the status quo may increase uncertainty and lead to dismissal. By showing that established recovery frameworks can explain the causal

mechanisms and outcomes experienced in greenspace programs, this could enhance how convincing programs are as an approach and highlight that they are worthy of attention. We aimed to fill this gap through qualitative interviews with greenspace program participants, staff and external health professionals to explore how greenspace programs could support development of recovery capital resources at an individual, social, and community level. Furthermore, we aimed to understand the resources which can be accrued by those experiencing co-occurring mental health and substance use challenges who attend a greenspace program. To our knowledge, this is the first paper to explore greenspace programs through the lens of recovery capital.

### **Materials and methods**

The findings presented in this paper come from a larger research project which aimed to develop evidence-based guidance manuals for health and social care practitioners, with the objective of informing the design and implementation of new greenspace interventions. This section describes the methodological approach of this project, as well as how the data for this paper was derived. Ethical approval was granted by the University of Stirling NHS, Invasive, or Clinical Research panel (NICR, paper 14134) and the Ethics Subgroup of the Research Coordinating Council of The Salvation Army. Rigorous risk assessments were conducted for data collection, as per The Salvation Army and University of Stirling protocols.

### ***Sample and recruitment***

Interviews were conducted by researchers [redacted] with relevant stakeholders across Scotland including staff working in greenspace programs and people with experience of PSU and mental health challenges who have engaged with/are engaging with greenspace programs ('greenspace program participants'). Greenspace program staff participants were recruited via email by the research team, while greenspace program participants were either identified and approached initially by staff or recruited in person by a member of the research team during visits to programs. Participants in relevant policy or referral roles were identified through preexisting networks of the research team and recruited via email.

Greenspace program participants and staff were drawn from two organizations running in Scotland. The first was a 12-week program run by a conservation organization working in Northern Scotland. On this program, where the majority of those attending have experience of PSU,

participants learn outdoor skills through activities such as bushcraft. Individuals attend a half-day session per week and engage in a range of activities and therapeutic support. Staff include rangers alongside health and social care practitioners, with peer-led support encouraged. Post-program participants can attend monthly meet ups organized by the service, which are ongoing with no end date. The second organization was a wilderness/adventure-based organization running programs across several geographical areas in Scotland, all involving residential stays and/or camping, and each lasting between 5-10 days. The organization also offers a range of resources including day sessions, post-program meet-ups, outdoor therapy courses, and employment-based courses. While the organization supports people experiencing a range of challenges, PSU is commonly reported across participants. As such, the staff (who come from a range of backgrounds, many with lived experience of PSU), have ample experience in supporting people's complex and diverse needs.

### **Data collection**

Written or verbally recorded informed consent was provided prior to each interview. Participants were asked to complete a demographic survey detailing age, gender, ethnicity, health board, mental health needs, drug/alcohol use, and/or professional role to better understand the sample diversity. Interviews were conducted in person or by phone and lasted an average of 39 minutes (range: 13 to 80 minutes). Interviews were audio recorded, professionally transcribed, and pseudo-anonymized to remove all identifying information. This meant that names and locations were removed, but participants were aware that they may still be identified through the quotes that they provided.

The interview topic guide included explicit questions on the outcomes experienced and observed during greenspace program participation to better understand program benefits from the perspective of different stakeholders (see [Supplementary File 1](#)). After each interview, participants were provided with a debrief sheet that included sources of support, contact information and details for any further questions. Greenspace program participants received a £25 voucher as an acknowledgment of their contribution to the project.

### **Data analysis**

As data for this paper is drawn from a wider project, the dataset was first coded with a slightly wider analytical lens. During this phase, the research team highlighted that many of the outcomes described by

participants corresponded closely with individual-, human-, physical-, social-, community-, and cultural-level capital literature. After initial coding, the research team re-coded the transcripts deductively using each level of recovery capital as an over-arching theme. Following re-coding, themes were developed, drawing on both recovery capital literature and the research teams' knowledge of the dataset in relation to the key benefits identified by participants. During the coding process, two members of the research team [redacted] engaged in frequent discussion to assess whether the key themes were adequately reflected through the analysis. The theme 'life meaning and purpose' was constructed inductively and added to the framework during coding, as life meaning and the navigation of the recovery process was shown to be a key theme in the data and was not adequately captured by the existing levels of recovery capital.

### **Results**

A total of thirty-three interviews were conducted with greenspace program participants (n=15), greenspace staff (n=8), strategic decision-makers (n=8), and external health professionals (n=2) across Scottish health boards (see [supplementary file 2](#)). The data from greenspace program participants and greenspace staff (n=23) was reported in this paper. Greenspace program participants reported a range of mental health challenges such as depression/low mood (n=11), anxiety (n=5), and suicidal ideation/attempt (n=3). Experiences listed under 'other' included: bipolar; complex/persistent grief; borderline personality disorder; low self-esteem; and complex Post Traumatic Stress Disorder. Participants also reported more general life experiences, which significantly affected their mental health. This included relationship breakdown; physical health conditions; criminal justice involvement, and social isolation.

Participants reported that they experienced problems (in the last year) with use of alcohol (n=11); powder or crack cocaine (n=5); opioids (n=4); and cannabis (n=3); with others reporting use of benzodiazepines and ketamine. Eight participants said that they had experience of alcohol and illicit drug problems, four said they only had problems with alcohol, and three said they only had problems with illicit drugs. Individuals reported being at distinct stages of substance use, with some still often using substances, some reducing use or working toward abstinence. Findings are reported under four themes. Themes one to three correspond to the levels of recovery capital outlined above (individual, social, and community). Theme four relates to the role of meaning and purpose during the recovery process. Each theme is formed of sub-themes

relating to key recovery resources described by participants (see Table 2).

### **Theme 1: Individual-level recovery capital**

Themes of individual recovery capital were apparent throughout discussions. Participants recognized greenspace program attendance as providing benefits, including improved capacity to deal with triggers, stressors and craving; improved capacity for positive routines and self-care practice; knowledge acquisition and physical capital.

#### **Capacity to deal with triggers, stressors and cravings**

Greenspace programs can encourage the development of positive coping strategies to manage difficult emotions, stressors and cravings. This is particularly significant for those with PSU, as employing alternative strategies to overcome triggers, stressors and cravings can encourage constructive personal development, an important aspect of individual-level recovery capital (Bunaciu et al, 2024). Several participants described incorporating mindfulness activities taught at greenspace programs into their daily routines:

I did mindfulness, which was a great help. I never did it before I went away, but we did it when we were away, and I've now tried to do it every morning before I get out of bed, to set myself up for today and have a positive outlook on life. (Greenspace program participant 10)

One staff member described an exercise where participants were encouraged to sit peacefully for periods of time with their back against a tree, enjoying nature and focusing on their breathing. They recalled that a participant later utilized these techniques when they were feeling overwhelmed around substance use, suggesting the skills gained on greenspace programs provide individual-level capital for those with experience of poor mental health and PSU:

He had a family wedding and a family bereavement and various things to go to. He said, 'When I went to these things, it was just quite overwhelming sometimes, everybody's drinking, I made this decision that I wasn't going to'. He said, 'I ran outside, I found a lamppost, pushed my back up against the lamppost and just stood there for a minute, did a breathing exercise, decided what I was going to do'. (Greenspace staff participant 7)

It is important to note that some participants perceived other attendees as struggling with maintaining positive techniques and coping strategies post-program.

One participant described the challenges for those who return to environments that disregard mental health challenges and normalize substance use. This highlights a need for program staff to consider supporting participants to navigate the long-term application of positive coping mechanisms to ensure long-lasting improvements to mental health and substance use challenges:

Yes, yes, a couple of the girls that I was with, they'd done amazing when we were away, no cannabis, no alcohol, no drugs, and then obviously they come back to the chaos and the phone calls and the madness and everyday life, and it's too much and a lot of them have started drinking again or smoking and- Yes. (Greenspace program participant 1)

#### **Capacity for positive routines and self-care practices**

Programs can increase individual-level recovery capital by supporting participants to develop new routines outside of existing practices that are detrimental to health and wellbeing, increasing individual-level recovery capital resources. Greenspace programs often incorporate routine and schedules, such as set starting times and set meals/breaks. Greenspace program participants described appreciating routine and recognized the immediate and long-term benefits of incorporating self-care into daily practice:

There's [sic] timetables, and that's got to be an applicable life skill right for people that don't have a lot of structure in their life. I started to enjoy it, I started to see the benefit of it very quickly; like knowing where to be, what to do, at what time, eat at this time. Doing that is taking care of yourself. (Greenspace program participant 5)

Greenspace program staff took the time to recognize the individual needs of participants, then incorporated these needs into the routine and structure of a program as a means of encouraging self-care. Understanding routine as self-care can increase individual-level recovery capital by encouraging participants to develop positive, meaningful routines outside of the program that can support recovery pathways:

A lot of people when they're on the course, they get into that routine, and they like having the routine of the journey, but then when they go home they don't have that, so they try and keep that routine in place in some way [...] The feedback is it's really helped them if they just get up in the morning and have breakfast at a normal time, it's a massive change for them. (Greenspace staff participant 4)

Identification and incorporation of activities and practices that improved mood were significant for

participants, as it empowered them to assess which practices could be meaningfully incorporated into their personal lives. This included mood diaries, sound boards and other activities that focus on emotional wellbeing. Participants described the long-term positive effects on their mental capacity to incorporate positive routines following greenspace program attendance:

Since I've got home from being in the [program], I'm more grounded in myself and more at peace. (Greenspace program participant 10)

### **Knowledge acquisition**

It is important for those with limited human recovery capital to have access to educational opportunities as a potential pathway to mental and physical wellbeing (Becker, 1962). Greenspace program participants reflected on how interactions with staff who were educated on nature and local ecosystems encouraged them to expand upon their own knowledge. Participants were particularly positive when describing their new knowledge of local plants and wildlife:

We were learning once about different mushrooms and things like that [...] my basic knowledge about mushrooms is like most of them are poisonous, you don't want to touch them or anything. But, no, it was surprising how much you could actually find out about particularly one mushroom. (Greenspace program participant 14)

Greenspace program participants described an increase in confidence in their skills following their attendance. For example, one participant explained how learning about wild food through the program motivated them to seek further education and training, which ultimately resulted in gaining qualifications, employment and subsequent financial capital:

[You would do] three or four days of, like, training and then that was for [food restaurant], and then after that you would get a contract after a week or something, and then you would have a place in [food restaurant]. (Greenspace program participant 11)

Greenspace program participants reported overall improvement to mood, as well as reduced feelings of anxiety, suggesting an increase of human-level recovery capital. Greenspace programs were described as incorporating activities that encourage attendees to recognize changes in their mood, leading to renewed perceptions on how the outdoors impacts mental health. Participants described their appreciation for the natural world and acknowledged improvements to mood:

Learning nature, about taking your feet off, walking on the grass. When you're at home, your mind's just all foggy and everything, you come here [nature] for half an hour and it just seems so nice to go back [laughs]. It's like chemicals and all the stress just comes off your shoulders. (Greenspace program participant 3)

### **1d) Physical capital**

Greenspace programs can encourage enjoyable physical activity for those who do not typically incorporate exercise into their routine. This is important, as poor physical health can compromise recovery journeys and can have negative effects on physical capital (Osborne and Kelly, 2023). Participants recognized that greenspace programs included physical exercise as an intrinsic component, rather than a direct activity or goal, leading to increased enthusiasm and engagement. Greenspace program participants described the physical benefits that can be experienced while outdoors:

Physical exercise is absolutely key to life happiness and mental health. So, whether you realize it or not, as you're doing the trip, it's got to be a benefit. And then you're sore, but you feel good, you feel you've accomplished something. If you've ever gone for a run, unless you're like a runner and that's what you do, I would say that nobody likes it at the beginning, but by the time it's done there's like, you know, cortisol and adrenaline and dopamine and whatever it is, it all starts coming in and you feel great, you know. (Greenspace program participant 5) It should be noted that the physical exercise component of greenspace programs may be challenging for demographics with different capabilities, such as additional mobility needs. For example, one participant described how typical greenspace program activities, such as hillwalking, may not be suitable for all attendees. This highlights not only the need for program and program staff to have the capacity to provide support to attendees with additional needs, but also for programs to incorporate dynamic activities that are inclusive of all capabilities:

...she had mobility difficulties, so I think she was there for about three or four weeks and then sort of decided it wasn't for her. (Greenspace program participant 6) Exercise was described by staff as a potential tool during recovery journeys. Physical responses, such as adrenaline rushes, were recognized as potential positive outcomes of engaging with a greenspace program. One staff member believes that greenspace program activities and the subsequent physical exercise can offer respite for participants experiencing symptoms including withdrawal and detox:

In terms of like physical activity for people that we work with, it's a massive thing, and you can't really do that type of thing indoors, you know what I mean? You can, obviously, in certain circumstances, but it's

not as easy. If somebody's struggling with addiction issues, or they're maybe detoxing or whatever else, then exercise is one of the best things you can do in terms of like building up your adrenaline to keep your endorphins up, which stops the withdrawal symptoms. (Greenspace staff participant 2) Participants highlighted the need for programs to ensure accessibility of physical resources to ensure attendees can meaningfully engage with activities. This means that program facilitators can act as a gateway to physical capital for individuals within the context of greenspace programs. Accessibility of resources varied from program to program, with some participants attending programs where equipment was provided by staff. Others highlighted challenges for potential attendees with limited physical capital, for example, those who cannot access essential equipment and clothing:

...take wellies, take waterproof trousers and you know, if you don't take them what's the point in coming to the group because like be prepared you know? (Greenspace program participant 7)

## **Theme 2: Social-level recovery capital**

Social-level recovery resources were discussed by participants in relation to building social connection, trust and relationships with staff, and existing social networks.

### **Building social connection**

Social connection to others with similar challenges can encourage the growth of social-level recovery capital (Roxburgh et al, 2024). Connecting through shared goals and experiences is an important aspect of greenspace programs, such as building shelters and sharing meals. Having a shared purpose was significant for participants and can encourage open communication between peers. One participant described how taking part in challenging activities facilitated social connection and support:

You sort of support each other and try and help each other through it to make it easier for them and help them overcome their challenges. It's a good way to bond and get closer and just make genuine human connections. (Greenspace program participant 12)

Greenspace program staff acknowledged the importance of mutual support amongst attendees to address social isolation and lack of connection. One staff member recalled participants adapting to their peers and environment, acclimating to the dynamic of the group to develop patience and understanding toward other attendees. This can lead to increased social connection,

as well as increased social-level recovery capital between peers from the first stages of attendance:

They were already beginning to see the need, the support needs of other people, and willingly kind of giving kindness and warmth towards each other. (Greenspace staff participant 7)

### **Trust and relationships with staff**

Greenspace program participants referred to staff as a vital part of their recovery journey and as a key source of social-level recovery capital and support. As opposed to traditional healthcare systems, where there are clear power dynamics between professional and patient, greenspace programs reportedly foster rapport and positive relationships between staff and participants:

They're not just a worker there, they become a part of your life for that [time]. And so you naturally, just as human beings do, get to know each other. It's good to be able to connect that way, because it lets you open up, because you see them more as a person. (Greenspace program participant 12)

Participants expressed the importance of feeling 'heard' while engaging with greenspace programs. Attendees generally felt like their needs and expectations were met, and that facilitators had reasonable expectations. Overall, the social interactions between staff and participants were 'human-first':

I think, not only being heard, but having a solution to what you're talking about is very important to me, because it gives you trust. I think again trust is another thing, it's an area that I've struggled to trust a person. So, to be heard, but to not only be heard, to have a solution, and to have somebody go 'What's going to work for you just now, what do you need?' (Greenspace program participant 9)

Participants described how greenspace programs felt different from typical treatment modalities they had experienced. Participants felt encouraged to discuss their thoughts and feelings openly but also acknowledged a lack of pressure from staff. One participant described an 'ease' to greenspace programs and interacting with staff, allowing them to feel safe to confide in others about past experiences:

But [name], she didn't push me, but she got a lot out of me, a lot of things that I've never told anybody. I think she was happy with that, but she didn't push me. How do you say, she eased it, eased it, eased herself in and let me talk about it in my time, not forcing anything. Then everything I needed to say, I got out. (Greenspace program participant 8)

### **Existing social networks**

Participants discussed how greenspace programs can help renew social connections by providing participants with the space and skills to reframe their existing relationships. Renewing established connections was described as a key motivator for behavior change. One participant believed that taking part in a program offered 'time away' from daily life and encouraged new outlooks on established networks:

Well, due to me relapsing, etc., I just got to a point where too much was too much for the family, and they never spoke to me, etc. So, I made the choice when I got back from [greenspace program] to not speak to my family for two weeks, because that was me basically finding myself, doing what's right for me, but after two weeks, again, I spoke to the family, and now it's just like old times, I cannot be any closer than I am with them. (Greenspace program participant 10)

It was acknowledged that while some existing networks were beneficial, others may negatively influence substance use behaviors. Several participants spoke about an increasing desire to avoid social scenarios that may trigger substance use, as they recognized the potential risks to their recovery. Participants described programs as providing a safe space for discussion without fear of judgment from established social networks. Furthermore, engaging with peers was recognized as stimulating an awareness of potential need to alter social networks to accommodate recovery:

I still talk to a few of the boys, well two of them anyway, but they're back on the drinking. My journey can't be around people that's like that. (Greenspace program participant 8)

### **Theme 3: Community-level recovery capital**

Participants discussed varied experiences that reflected the themes of engaging with community and cultural capital when reflecting on resources that facilitated their wellbeing journey.

#### **Engaging with wider resources**

Greenspace staff believed that program attendance can establish an important foundation for those who may not typically engage with services. Individuals engrossed within their community are typically likely to have higher levels of community-level recovery capital (Laudet & White, 2008). Staff encouraged participants to seek out community resources beyond the program to improve their health and wellbeing:

We build that foundation... [service] then builds on the foundation, so we then have to kind of look at what other services might be out there, especially in the local area, for them to kind of get engaged with. (Greenspace staff participant 2)

Attending a greenspace program was considered a contributing factor for participants who sought out and engaged in further recovery services, increasing their community-level recovery resources. Participants reflected on renewed, positive perceptions toward staff of PSU and mental health interventions, and how positive experiences with greenspace program staff rebuilt their trust in other forms of support. One participant described their engagement with group-based interventions following program completion, something they had not done before:

Basically, the only thing different I'm doing now is staying clean and sober. What I've never ever done, or even entertained in the past, is going to meetings. Now I go to the CA, NA, AA. I'm engaging with addiction services, which I've never done in the past. (Greenspace program participant 4)

#### **Cultural capital**

Participants felt that greenspace programs allowed them to develop recovery capital through shared experience. Recovery-positive culture norms (such as ways to reduce mental health and substance use related harm) were shared through open dialogue around personal experiences, successes and challenges. One participant described this feeling as being part of a 'club', suggesting similar intentions amongst attendees. This led to increased cultural capital as participants had increased regular interactions with those with similar beliefs and values and ultimately, developed positive cultural bonds within their community:

So, there are weekly meetings where we talk about our problems, and our failures, and our successes, and all that. You become part of a larger family, like an actual part. It's like being part of a class in a way. You're actually part of some sort of club. (Greenspace program participant 2)

Greenspace program staff described the ways in which program attendance dismantled cultural barriers by encouraging interaction between participants from different demographics. Greenspace programs support the accrual of recovery capital through a culture of inclusivity which nurtures the dissemination of information and resources to improve mental health, substance use and wellbeing outcomes. Participants views were perceived by staff to shift to be more willing to seek out shared values beyond initial interactions.

Furthermore, participants gained confidence and skills to engage with those from a background which differs from their own, as well as the ability to successfully utilize information and resources gained from these interactions to achieve their own recovery goals:

So then there could be people from Aberdeen, there could be people from Dundee, people from Glasgow, Ayrshire, and it's very common for us to be working with a group and they end up saying, "Oh, I hope there's nobody from Edinburgh there." And you're saying, "Well, really? I can guarantee you, once you're on a journey and you meet the wee boy from Edinburgh, you'll end up the best of pals." So it's breaking down the barriers, the culture barriers, which is really, really good. (Greenspace staff participant 1)

Program staff acknowledged the importance of fostering a supportive culture of recovery within their programs, meaning a 'person-centered' approach which encouraged engagement from those with varied experiences, including differing stages of recovery. This approach was perceived to help reduce power imbalances between staff and participants, with less focus on specific medical diagnoses, and instead prioritized an individual's wellbeing and growth. By doing so, staff aimed to create an environment where participants feel valued and empowered beyond their health conditions. Shifting perceptions to include less emphasis on individual pathologies was acknowledged to support the accrual and sustainment of recovery capital resources by encouraging participants to consider beyond personal challenges to understand the various collective facets which may have negative implications for mental health and substance use outcomes. Furthermore, reducing power imbalances encouraged participants to seek help from service providers, meaning these participants went on to gain further recovery resources:

The kind of feedback we're getting is great from participants, because there's a lot of people that have tried traditional therapy, and it's just not worked for them, and it's trying to break down that kind of relationship as, it can be like an authority figure, almost, in a room in a one-to-one with someone. (Greenspace staff participant 4)

Program participants reiterated the importance of feeling empowered to make positive changes through a culture of understanding the dynamic nature of the recovery journey. Furthermore, participants were aware that what was understood as 'wellbeing' varies between attendees. Many participants recognized the role of program facilitators in the development of a shared culture of recovery between attendees, while still appreciating the individualized aspects recovery:

Absolutely, yes definitely everyone is in a similar position and as I say the helpers... there's a group of people and they would all have a chat and see how we were getting on since last week. Even though at times you're doing the [program] you're not necessarily doing very well you know, so this was helping and they were supportive and trying to get you where you want to be, although it's never been easy but this certainly is a help along the way. (Greenspace program participant 6)

#### **Theme 4: Life meaning and purpose**

Meaning and purpose was identified by participants as a motivator for achieving recovery. Several participants described how engaging with greenspace programs had been part of an ongoing process of exploring existential questions. Participants discussed how immersing themselves in nature had provided an opportunity to develop their perspective on life through connection to their environment:

It just gives you so much more, I don't know, freedom. Being in the canoe with the water around me, and I just felt free [...] I don't know if it's the water, the trees, fresh air, it just really does help your mental health, and it makes you think a lot clearer; it puts a lot of things into perspective. (Greenspace program participant 1)

Some participants believed that greenspace program attendance provided a deeper connection to nature, which encouraged a renewed sense of belonging. This occurred through practices such as meditation, as they allowed participants to become bonded to their environment via careful consideration of their impact on the wider world. One participant emphasized the importance of this connection when looking at the 'bigger picture' of one's lifestyle:

Being out in nature on my own is like different to when I'm maybe with a group. And I suppose it's kind of like, in a similar way to meditation kind of, you can like quiet your mind and just like focus on that thing. I suppose it's kind of like an element of that, but also with the connection to the earth and nature. Like if you think about the sort of age of the universe, and the scale of the universe, and things, and like everything that the planet provides for us and stuff. (Greenspace program participant 13)

Many participants described how a sense of awe and wonder in nature could lead to feelings of being connected with something greater than oneself. Participants were careful to distinguish this from traditional religion; some described the feeling as simply 'profound', and others noted a sense of 'higher power'

through nature which they believed was important to their recovery:

I'm not religious, but I'm definitely spiritual. So, my take on Mother Earth is what I would take to be my God, and the universe is my higher power. So, I definitely feel that. Human beings are part of nature is my take on it. (Greenspace program participant 9)

Another participant described connecting to aspects of spirituality, in relation to experiencing a sense of belonging and value, which had not always been the case in their past. This notion of spirituality can provide motivation and solace for those on a recovery journey (White & Laudet, 2006). Participants further noted that they found a sense of spirituality in nature which allowed them to process grief through connecting to a deceased loved one:

Spiritual, yes, because it was like I lost my dad in September last year, and just like birds, different birds can mean different things, and like robins means that somebody in heaven's close to you and things like that. So, in a certain aspect, yes, I would say spiritual. (Greenspace program participant 14)

## Discussion

Whilst emerging research suggests that greenspace program engagement can be beneficial for those experiencing PSU and mental health challenges (Benvegna et al, 2024; Diaz-Martinez et al, 2024; Houlden et al, 2018; Masterton et al, 2022), there has been a lack of specific exploration of the role of programs in supporting the accrual of recovery capital. This paper addresses this gap and highlights participant descriptions of the positive impacts of greenspace programs, as well as how this relates to established recovery capital resources. Greenspace programs for PSU may be perceived as novel or untested approaches, with an assumption that they lack a robust underpinning theoretical framework when compared with other, more established, PSU treatment and support modalities. However, our findings highlight that greenspace programs map well onto the scientific literature on recovery capital.

From an individual perspective, greenspace programs were described by participants as a catalyst for behavior change, as they helped attendees develop positive coping mechanisms to use in distressing or triggering scenarios. Experiences of cravings, triggers, and negative emotions are known to be a barrier to achieving positive change throughout the recovery journey, particularly in the early stages (Herczyk et al, 2023). Improved mood from engaging with nature, and

the development of coping strategies while on programs (such as mindfulness), may help to manage emotional challenges experienced during the recovery process. Findings also showed that physical activity could be an outlet for those who are struggling with reducing substance use by providing an alternative focus, something that has been previously documented in the literature (Howarth et al, 2018).

Participant discussion also highlighted that greenspace programs can have longer-term impacts on well-being and health through impacting areas such as sense of belonging and self-esteem. Enhanced self-esteem is critical for recovery, as it can provide an increased sense of self-efficacy and sense of agency to alter perceptions (Benvegna et al, 2024; Laudet & White, 2008). Improved self-perception and confidence were described as significant changes which help enable the individual (re)integrate with their community. This could occur through an improved sense of self, personal value, engagement with wider PSU services or, for some, into further employment or education. There is evidence that integration back into education and employment is a predictor of prolonged recovery for people with PSU, as well as a priority for welfare policies (Neale et al, 2015; Patton & Best, 2024; Robertson et al, 2022).

Findings from this study highlighted that another key element of greenspace programs is their capacity to build social capital, through fostering supportive connections between individuals. Mutual support and connection through shared experiences can facilitate sustained recovery by establishing social networks that are compatible with renewed perceptions toward substance use behaviors (Collinson & Best, 2019). Further, our study shows elevated levels of trust in staff contributed to an increased willingness to discuss thoughts and feelings. Previous research suggests that recovery progress, or even engagement with recovery interventions, may be limited by negative perceptions of services and service providers, in turn delaying vital care and support (Cloud & Granfield, 2008; Gutierrez et al, 2020; Paquette et al, 2018). To build capital, the support provided must be perceived as a safe, inclusive space, which is not always the case with traditional clinical services (O'Carroll & Wainwright, 2021; Paquette et al, 2018). In contrast, the greenspace programs described in this research were described by participants as non-threatening and understood to be supportive environments.

Our findings highlighted self-worth and individual purpose as a key tenet within programs. Greenspace program staff and participants emphasized that renewing self-purpose encouraged participants to consider

behaviors, thoughts and feelings that could be detrimental to their recovery journey. This corresponds closely with a body of literature that highlights the importance of reshaping the sense of self during the recovery process (Horton et al, 2016, Kitzinger et al, 2023; Lyons et al, 2010; Schoenberger et al, 2022). Indeed, it has been proposed that individuals who lack meaning and purpose during recovery may be more at risk of re-initiating risk behaviors such as substance use (Csabonyi & Phillips, 2020). Participants considered greenspace programs to offer less ruminative self-exploration, and being present in nature was thought to provide an immediate sense of renewed self-confidence in comparison to typical treatment modalities, such as therapy or counseling. These components of greenspace programs can support those with experience of PSU and mental health challenges to find a sense of calm within nature and ultimately, reduce the risk of behaviors that negatively affect health and wellbeing (Fenton et al, 2025).

Within the current study findings and across the literature more widely, spirituality has been cited as a key pathway to a sense of meaning and purpose (Lyons et al, 2010, White & Kurtz, 2005; White & Nicolaus, 2005). Spirituality and its relationship to recovery is difficult to conceptualize due to the complexity of securing a clear definition of spirituality that applies to all understandings (Lyons et al, 2010; White & Laudet, 2006). However, spirituality can be experienced both in religious and secular terms. Our findings show that secular spirituality, meaning, and purpose are influenced by connection to peers, the wider world and nature. Furthermore, sense of meaning and purpose often occur through social transactions, social learning, changes in social networks and positive social influences (Best et al, 2016). All understandings of spirituality place emphasis on the search for meaning and self-exploration, finding significance within non-material external sources (White and Kurtz, 2005). Emphasis on transcendent higher powers (Dossett, 2013) may be off putting for some greenspace programs and immersion in nature may offer an alternative adjunct experience of spirituality.

### **Strengths and limitations**

The main strength of this paper is that, to our knowledge, there has been limited examination of how greenspace programs can support people with PSU and mental health challenges through the lens of recovery capital. Further strengths include the use of recovery capital as a theoretical framework to underpin the research, utilizing established means to contribute to

literature on the potential benefits of greenspace programs. It is important to note that data was collected from a variety of participants living in Scotland, and as such, greenspace programs' design and benefits may differ depending on location, participant type and context. Nevertheless, this work is important to build evidence and buy-in for novel interventions, which have shown clear potential, at a time where substance-related harms are rising (Masterton et al, 2022).

It may be argued that this paper uncritically adopts the notion of recovery and recovery capital. Recovery capital definitions have been critiqued, as they can be operationalized politically and socially to prioritize abstinence-focused policy and thereby, exclude those who cannot, or do not want to, stop using substances. The concept of recovery adopted by this paper relates not to solely to abstinence, but rather to a broader and more holistic perspective recognizing the importance of improved wellbeing, social circumstance, and health (Parlier-Ahmal et al, 2021; Pettersen et al, 2023, Zenmore et al, 2023). Despite the evidence presented in this paper, it is important to recognize that those experiencing PSU and mental health concerns are not a homogenous group, and individual circumstances will contribute to program success when looking to encourage the accrual of individual, social, and community recovery capital. Understandings of what constitutes recovery capital will differ depending on the cultural and ethnic demographic of an individual (Bunaciu et al, 2024; Hennessy, 2017). This presents a further limitation, relating to the lack of diversity amongst the participant group. Despite efforts to diversify recruitment, participants were overwhelmingly White Scottish/British, which may mean that results have not captured how greenspace program experiences may differ according to ethnic background.

### **Conclusion**

Our findings show that greenspace programs are perceived to provide notable benefits for individuals experiencing PSU and mental health challenges. Participants believed that the programs supported their recovery journeys. Furthermore, responses correlated with notions associated with the development of individual, social, and community resources which are critical to sustaining recovery. While there continues to be contention around the meaning of recovery and recovery capital within the field, this research highlights the value of greenspace programs as an accessible, non-stigmatizing intervention that could support a person through their recovery journey. Importantly, by

aligning participant experiences with recovery theory, the findings add to the evidence base for greater investment and integration of greenspace approaches within treatment services.

## Author contributions

CRedit: **Morgan Torrance:** Writing – review & editing; **Wendy Masterton:** Writing – review & editing; **Danilo Falzon:** Writing – review & editing; **Hannah Carver:** Writing – review & editing; **Tessa Parkes:** Writing – review & editing; **Sandra Engstrom:** Writing – review & editing; **Edward Duncan:** Writing – review & editing; **Joshua Dumbrell:** Writing – review & editing; **Kirsty Park:** Writing – review & editing; **Rebecca Lovell:** Writing – review & editing; **Trish Gorely:** Writing – review & editing.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Ethical approval

This study was conducted according to the guidelines of the Declaration of Helsinki and ethical approval for the study was granted by University of Stirling's NHS, Invasive, or Clinical Research panel (NICR, ref. 14134) and the Ethics Subgroup of the Research Coordinating Council of The Salvation Army. All participants provided informed consent prior to the interview process.

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## Data availability statement

The data that supports the findings of this study are available on request from the corresponding author, WM. The data is not publicly available due to containing information that could compromise the privacy of research participants.

## References

Arndt, S., Sahker, E., & Hedden, S. (2017). Does the Assessment of Recovery Capital scale reflect a single or multiple domains? *Substance Abuse and Rehabilitation*, 8, 39–43. volume <https://doi.org/10.2147/SAR.S138148>

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy*, 70(5, Part 2), 9–49. <https://doi.org/10.1086/258724>

Bellaert, L., Zerrouk, A., Sinclair, D. L., Martinelli, T. F., Best, D., Laenen, F. V., van de Mheen, D., & Vanderplasschen, W. (2024). Correlates and stability of recovery capital among persons in long-term recovery from drug addiction. In M. Florence, W. Vanderplasschen, M. Yu, J. De Maeyer, & S. Savahl (Eds), *Handbook of addiction, recovery and quality of life: Cross-cutting perspectives from around the globe* (pp. 421–434). Springer Nature Switzerland. [https://doi.org/10.1007/978-3-031-65873-0\\_29](https://doi.org/10.1007/978-3-031-65873-0_29)

Benvegnù, G., Semenzato, M., Urbani, A., Zanlorenzi, I., Cibin, M., & Chiamulera, C. (2024). Nature-based experience in Venetian lagoon: Effects on craving and wellbeing in addict residential inpatients. *Frontiers in Psychology*, 15, 1356446. <https://doi.org/10.3389/fpsyg.2024.1356446>

Berry, M. S., Rung, J. M., Crawford, M. C., Yurasek, A. M., Ferreiro, A. V., & Almog, S. (2021). Using greenspace and nature exposure as an adjunctive treatment for opioid and substance use disorders: Preliminary evidence and potential mechanisms. *Behavioural Processes*, 186, 104344. <https://doi.org/10.1016/j.beproc.2021.104344>

Best, D., Beckwith, M., Haslam, C., Alexander Haslam, S., Jetten, J., Mawson, E., & Lubman, D. I. (2016). Overcoming alcohol and other drug addiction as a process of social identity transition: The social identity model of recovery (SIMOR). *Addiction Research & Theory*, 24(2), 111–123. <https://doi.org/10.3109/16066359.2015.1075980>

Best, D., & Hennessy, E. A. (2022). The science of recovery capital: Where do we go from here? *Addiction (Abingdon, England)*, 117(4), 1139–1145. <https://doi.org/10.1111/add.15732>

Best, D., & Ivers, J.-H. (2022). Inkspots and ice cream cones: A model of recovery contagion and growth. *Addiction Research & Theory*, 30(3), 155–161. <https://doi.org/10.1080/16066359.2021.1986699>

Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood Press.

Bragg, R., & Atkins, G. (2016). A review of nature-based interventions for mental health care. *Natural England Reports*. <http://www.gov.uk/government/organisations/natural-england>

Browning, M. H. E. M., Rigolon, A., McAnirlin, O., & Yoon, H. (2022). Where greenspace matters most: A systematic review of urbanicity, greenspace, and physical health. *Landscape and Urban Planning*, 217, 104233. <https://doi.org/10.1016/j.landurbplan.2021.104233>

Bunaciu, A., Bliuc, A.-M., Best, D., Hennessy, E. A., Belanger, M. J., & Benwell, C. S. Y. (2024). Measuring recovery capital for people recovering from alcohol and drug addiction: A systematic review. *Addiction Research & Theory*, 32(3), 225–236. <https://doi.org/10.1080/16066359.2023.2245323>

Cleveland, H. H., Brick, T. R., Knapp, K. S., & Croff, J. M. (2021). Recovery and recovery capital: Aligning measurement with theory and practice. In *Family resilience and recovery from opioids and other addictions* (pp. 109–128). Cham: Springer International Publishing.

Cloud, W., & Granfield, R. (2008). Conceptualizing recovery capital: Expansion of a theoretical construct. *Substance Use & Misuse*, 43(12–13), 1971–1986. <https://doi.org/10.1080/10826080802289762>

Collinson, B., & Best, D. (2019). Promoting recovery from substance misuse through engagement with community assets: Asset based community engagement. *Substance*

- Abuse: Research and Treatment*, 13, 1178221819876575. <https://doi.org/10.1177/1178221819876575>
- Coventry, P. A., Brown, J., Pervin, J., Brabyn, S., Pateman, R., Breedvelt, J., Gilbody, S., Stancliffe, R., McEachan, R., & White, P. (2021). Nature-based outdoor activities for mental and physical health: Systematic review and meta-analysis. *SSM - Population Health*, 16, 100934. <https://doi.org/10.1016/j.ssmph.2021.100934>
- Croff, J. M., & Beaman, J. (Eds.). (2021). *Family resilience and recovery from opioids and other addictions*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-56958-7>
- Csabonyi, M., & Phillips, L. J. (2020). Meaning in life and substance use. *Journal of Humanistic Psychology*, 60(1), 3–19. <https://doi.org/10.1177/0022167816687674>
- Díaz-Martínez, F., Sánchez-Sauco, M. F., Cabrera-Rivera, L. T., Ortín-Fernández, C. A., Orenes-Piñero, E., & Ortega-García, J. A. (2024). Harnessing the healing power of nature: A review of natural interventions in substance abuse treatment and prevention. *Environmental Health and Preventive Medicine*, 29(0), 64–64. <https://doi.org/10.1265/ehpm.24-00145>
- Dossett, W. (2013). Addiction, spirituality and 12-step programmes. *International Social Work*, 56(3), 369–383. <https://doi.org/10.1177/0020872813475689>
- Duffy, P., & Baldwin, H. (2013). Recovery post treatment: Plans, barriers and motivators. *Substance Abuse Treatment, Prevention, and Policy*, 8(1), 6. <https://doi.org/10.1186/1747-597X-8-6>
- Eekhoudt, C. R., Sandhu, M., Mniszak, C., Goodyear, T., Turuba, R., Marchand, K., Barbic, S., & Fast, D. (2024). Looking beyond drugs: A scoping review of recovery in the context of illicit substance use among adolescents and young adults. *The International Journal on Drug Policy*, 133, 104598. <https://doi.org/10.1016/j.drugpo.2024.104598>
- Fenton, M. P., Smail, E. J., Konyayev, K., McCall-Junkin, P., & LoTempio, S. (2025). Substance use among adolescents and young adults: A scoping review. *Environment and Behavior*, 57, 143–178. <https://doi.org/10.1177/00139165251330274>
- Fomiatti, R., Moore, D., & Fraser, S. (2019). The improvable self: Enacting model citizenship and sociality in research on 'new recovery'. *Addiction Research & Theory*, 27(6), 527–538. <https://doi.org/10.1080/16066359.2018.1544624>
- Galderisi, S., Heinz, A., Kastrup, M., Beezhold, J., & Sartorius, N. (2015). Toward a new definition of mental health. *World Psychiatry: Official Journal of the World Psychiatric Association (WPA)*, 14(2), 231–233. <https://doi.org/10.1002/wps.20231>
- Garst, B. A., Vanic, M., Melton, T. N., Foster, C., & Bowers, E. P. (2025). Principles and practices of impactful nature-based positive youth development programs. *Current Opinion in Psychology*, 65, 102048. <https://doi.org/10.1016/j.copsyc.2025.102048>
- Goshorn, J. R., Gutierrez, D., & Dorais, S. (2023). Sustaining recovery: What does it take to remain in long-term recovery? *Substance Use & Misuse*, 58(7), 900–909. <https://doi.org/10.1080/10826084.2023.2196557>
- Gudmundsson, M., Pálsdóttir, A. M., Bejerholm, U., & Argentzell, E. (2025). Outcomes on health, recovery and activity level for mental health service users attending a novel nature-based intervention: A prospective study. *Nordic Journal of Psychiatry*, 79(3), 240–248. <https://doi.org/10.1080/08039488.2025.2483736>
- Gutierrez, D., Crowe, A., Mullen, P. R., Pignato, L., & Fan, S. (2020). Stigma, help seeking, and substance use. *The Professional Counselor*, 10(2), 220–234. <https://doi.org/10.15241/dg.10.2.220>
- Gyamfi, N., Bhullar, N., Islam, M. S., & Usher, K. (2025). Models and frameworks of mental health recovery: A scoping review of the available literature. *Journal of Mental Health (Abingdon, England)*, 34(2), 153–165. <https://doi.org/10.1080/09638237.2022.2069713>
- Harper, N. J. (2017). Wilderness therapy, therapeutic camping and adventure education in child and youth care literature: A scoping review. *Children and Youth Services Review*, 83, 68–79. <https://doi.org/10.1016/j.childyouth.2017.10.030>
- Hennessy, E. A. (2017). Recovery capital: A systematic review of the literature. *Addiction Research & Theory*, 25(5), 349–360. <https://doi.org/10.1080/16066359.2017.1297990>
- Herczyk, J. M., Zullig, K. J., Davis, S. M., Mallow, J., Hobbs, G. R., Davidov, D. M., Lander, L. R., & Theeke, L. (2023). Association of loneliness and mindfulness in substance use treatment retention. *International Journal of Environmental Research and Public Health*, 20(16), 6571. <https://doi.org/10.3390/ijerph20166571>
- Horton, E. G., Luna, N., & Malloy, T. (2016). Associations between spirituality, meaning in life, and depressive disorders among a sample of individuals in treatment for substance-use disorders. *Journal of Spirituality in Mental Health*, 18(4), 283–299. <https://doi.org/10.1080/19349637.2016.1159941>
- Houlden, V., Weich, S., Porto De Albuquerque, J., Jarvis, S., & Rees, K. (2018). The relationship between greenspace and the mental wellbeing of adults: A systematic review. *PloS One*, 13(9), e0203000. <https://doi.org/10.1371/journal.pone.0203000>
- Howarth, M., Rogers, M., Withnell, N., & McQuarrie, C. (2018). Growing spaces: An evaluation of the mental health recovery programme using mixed methods. *Journal of Research in Nursing: JRN*, 23(6), 476–489. <https://doi.org/10.1177/1744987118766207>
- Joschko, L., Pálsdóttir, A. M., Grahn, P., & Hinse, M. (2023). Nature-based therapy in individuals with mental health disorders, with a focus on mental well-being and connectedness to nature—A pilot study. *International Journal of Environmental Research and Public Health*, 20(3), 2167. <https://doi.org/10.3390/ijerph20032167>
- Kitzinger, R. H., Gardner, J. A., Moran, M., Celkos, C., Fasano, N., Linares, E., Muthee, J., & Royzner, G. (2023). Habits and routines of adults in early recovery from substance use disorder: Clinical and research implications from a mixed methodology exploratory study. *Substance Abuse: Research and Treatment*, 17, 11782218231153843. <https://doi.org/10.1177/11782218231153843>
- Laudet, A. B., & White, W. L. (2008). Recovery capital as prospective predictor of sustained recovery, life satisfaction, and stress among former poly-substance users. *Substance Use & Misuse*, 43(1), 27–54. <https://doi.org/10.1080/10826080701681473>
- Leamy, M., Bird, V., Boutillier, C. L., Williams, J., & Slade, M. (2011). Conceptual framework for personal recovery in mental health: Systematic review and narrative synthesis. *The British Journal of Psychiatry: The Journal of Mental Science*, 199(6), 445–452. <https://doi.org/10.1192/bjp.bp.110.083733>
- Leighton, J., Lopez, K., & Johnson, C. (2021). "There is Always Progress to Be Made": Reflective narratives on outdoor therapeutic recreation for mental health support. *Therapeutic Recreation Journal*, 55(2). <https://doi.org/10.18666/TRJ-2021-V55-I2-10653>

- Lyons, G. C. B., Deane, F. P., & Kelly, P. J. (2010). Forgiveness and purpose in life as spiritual mechanisms of recovery from substance use disorders. *Addiction Research & Theory, 18*(5), 528–543. <https://doi.org/10.3109/16066351003660619>
- Masterton, W. (2021). *Development of a realist-informed intervention framework for greenspace programmes for people with poor mental health and problem substance use.*
- Masterton, W., Carver, H., Parkes, T., & Park, K. (2020). Greenspace interventions for mental health in clinical and non-clinical populations: What works, for whom, and in what circumstances? *Health & Place, 64*, 102338. <https://doi.org/10.1016/j.healthplace.2020.102338>
- Masterton, W., Park, K., Carver, H., & Parkes, T. (2021). Greenspace programmes for mental health: A survey study to test what works, for whom, and in what circumstances. *Health & Place, 72*, 102669. <https://doi.org/10.1016/j.healthplace.2021.102669>
- Masterton, W., Parkes, T., Carver, H., & Park, K. J. (2022). Exploring how greenspace programmes might be effective in supporting people with problem substance use: A realist interview study. *BMC Public Health, 22*(1), 1661. <https://doi.org/10.1186/s12889-022-14063-2>
- Neale, J., Tompkins, C., Wheeler, C., Finch, E., Marsden, J., Mitcheson, L., Rose, D., Wykes, T., & Strang, J. (2015). "You're all going to hate the word 'recovery' by the end of this": Service users' views of measuring addiction recovery. *Drugs: Education, Prevention and Policy, 22*(1), 26–34. <https://doi.org/10.3109/09687637.2014.947564>
- Nejade, R. M., Grace, D., & Bowman, L. R. (2022). What is the impact of nature on human health? A scoping review of the literature. *Journal of Global Health, 12*, 04099. <https://doi.org/10.7189/jogh.12.04099>
- Obeng, J. K., Kangas, K., Manninen, O., Stamm, I., & Tolvanen, A. (2025). Nature-Based Interventions Promoting the Well-Being of Finnish Youth Outside Education or Employment. *Journal of Social Service Research, 51*(4), 1014–1029. <https://doi.org/10.1080/01488376.2025.2472257>
- O'Carroll, A., & Wainwright, D. (2021). Doctor–patient interactions that exclude patients experiencing homelessness from health services: An ethnographic exploration. *BJGP Open, 5*(3) BJGPO.2021.0031. <https://doi.org/10.3399/BJGPO.2021.0031>
- Osborne, B., & Kelly, P. J. (2023). Substance use disorders, physical health and recovery capital: Examining the experiences of clients and the alcohol and other drug workforce. *Drug and Alcohol Review, 42*(6), 1410–1421. <https://doi.org/10.1111/dar.13689>
- Paquette, C. E., Syvertsen, J. L., & Pollini, R. A. (2018). Stigma at every turn: Health services experiences among people who inject drugs. *The International Journal on Drug Policy, 57*, 104–110. <https://doi.org/10.1016/j.drugpo.2018.04.004>
- Parlier-Ahmad, A. B., Terplan, M., Sviskis, D., Ellis, L., & Martin, C. (2021). Recovery capital among people receiving treatment for opioid use disorder with buprenorphine. *Harm Reduction Journal, 18*(103) <https://doi.org/10.1186/s1295402100553w>
- Pars, E., VanDerNagel, J. E. L., Dijkstra, B. A. G., & Schellekens, A. F. A. (2023). Using the recovery capital model to explore barriers to and facilitators of recovery in individuals with substance use disorder, psychiatric comorbidity and mild-to-borderline intellectual disability: A case series. *Journal of Clinical Medicine, 12*(18), 5914. <https://doi.org/10.3390/jcm12185914>
- Patton, D., & Best, D. (2024). Motivations for change in drug addiction recovery: Turning points as the antidotes to the pains of recovery. *Journal of Drug Issues, 54*(3), 346–366. <https://doi.org/10.1177/00220426221140887>
- Pettersen, G., Bjerke, T., Hoxmark, E. M., Eikeng Sterri, N. H., & Rosenvinge, J. H. (2023). From existing to living: Exploring the meaning of recovery and a sober life after a long duration of a substance use disorder. *Nordisk Alkohol- & Narkotikatidskrift: NAT, 40*(6), 577–589. <https://doi.org/10.1177/14550725231170454>
- Picton, C., Fernandez, R., Moxham, L., & Patterson, C. F. (2020). Experiences of outdoor nature-based therapeutic recreation programs for persons with a mental illness: A qualitative systematic review. *JBI Evidence Synthesis, 18*(9), 1820–1869. <https://doi.org/10.11124/JBISRIR-D-19-00263>
- Pilgrim, D. (2008). Recovery' and current mental health policy. *Chronic Illness, 4*(4), 295–304. <https://doi.org/10.1177/1742395308097863>
- Robertson, I. E., Sagvaag, H., Selseng, L. B., & Nesvaag, S. (2022). The hunt for a job: Narrating the process of gaining employment for people in recovery from lives dominated by drug use. *Drugs: Education, Prevention and Policy, 29*(6), 675–684. <https://doi.org/10.1080/09687637.2021.1973962>
- Roxburgh, A. D., Best, D., Lubman, D. I., & Manning, V. (2024). Composition of social networks to build recovery capital differ across early and stable stages of recovery. *Addiction Research & Theory, 32*(3), 186–193. <https://doi.org/10.1080/16066359.2023.2238594>
- Russell, K. (2005). Preliminary results of a study examining the effects of outdoor behavioral healthcare treatment on levels of depression and substance use frequency. *Journal of Experiential Education, 27*(3), 305–307. <https://doi.org/10.1177/105382590502700311>
- Sachs, A., Kolster, A., Wrigley, J., Papon, V., Opacin, N., Hill, N., Howarth, M., Rochau, U., Hidalgo, L., Casajuana, C., Siebert, U., Gerhard, J., Daher, C., & Litt, J. (2024). Connecting through nature: A systematic review of the effectiveness of nature-based social prescribing practices to combat loneliness. *Landscape and Urban Planning, 248*, 105071. <https://doi.org/10.1016/j.landurbplan.2024.105071>
- Saunders, J. B., & Latt, N. C. (2021). Diagnostic definitions and classification of substance use disorders. In N. el-Guebaly, G. Carrà, M. Galanter, & A. M. Baldacchino (Eds), *Textbook of addiction treatment: International perspectives* (pp. 91–113). Springer International Publishing. <https://doi.org/10.1007/978-3-030-36391-8>
- Schoenberger, S. F., Park, T. W., dellaBitta, V., Hadland, S. E., & Bagley, S. M. (2022). "My Life Isn't Defined by Substance Use": Recovery Perspectives Among Young Adults with Substance Use Disorder. *Journal of General Internal Medicine, 37*(4), 816–822. <https://doi.org/10.1007/s11606-021-06934-y>
- Shirazi, A., Brody, A. L., Soltani, M., & Lang, A. J. (2025). Recovery horizons: Nature-based activities as adjunctive treatments for co-occurring post-traumatic stress disorder and substance use disorders. *American Journal of Lifestyle Medicine, 19*(4), 626–638. <https://doi.org/10.1177/15598276241300475>
- Tchounwou, P. B. (2004). Environmental research and public health. *International Journal of Environmental Research and Public Health, 1*(1), 1–2. <https://doi.org/10.3390/ijerph2004010001>

- Theodoropoulou, L., Vitellone, N., & Duff, C. (2022). Practising recovery: New approaches and directions. *The International Journal on Drug Policy*, 107, 103802. <https://doi.org/10.1016/j.drugpo.2022.103802>
- Thornton, T., & Lucas, P. (2011). On the very idea of a recovery model for mental health. *Journal of Medical Ethics*, 37(1), 24–28. <https://doi.org/10.1136/jme.2010.037234>
- White, B., & Cloud, W. (2008). Recovery capital: A primer for addiction professionals. *Counselor*, 9(5), 22–27.
- White, W., & Kurtz, E. (2005). The varieties of recovery experience: A primer for addiction treatment professionals and recovery advocates. *International Journal of Self Help and Self Care*, 3(1-2), 21–61. <https://doi.org/10.2190/911R-MTQ5-VJ1H-75CU>
- White, W., & Laudet, A. (2006). Spirituality, science and addiction counselling. *Counselor Magazine*, 7(1), 56–59.
- White, W., & Nicolaus, M. (2005). Styles of secular recovery. *Counselor*, 6(4), 58–61.
- Zenmore, S. E., Ziemer, K. L., Gilbert, P. A., Karno, M. P., & Kaskutas, L. A. (2023). Understanding the shared meaning of recovery from substance use disorders: New findings from the what is recovery study. *Substance Abuse: Research and Treatment*, 17, 1–12. <https://doi.org/10.1177/11782218231199372>